

INDEX TO VOL. VII.

# SCHOOL SCIENCE AND MATHEMATICS

A Journal for Science and Mathematics Teachers in Secondary Schools

*Founded by C. E. Linebarger*

CHAS. H. SMITH

EDITOR

Hyde Park High School, Chicago

CHAS. M. TURTON

BUSINESS MANAGER

South Chicago High School, Chicago

DEPARTMENTAL EDITORS

BOTANY—O. W. CALDWELL

School of Education, University of Chicago

CHEMISTRY—A. L. SMITH

Englewood High School, Chicago

EARTH SCIENCE—C. E. PEET

Lewis Institute, Chicago

MATHEMATICS PROBLEMS—IRA M. DE LONG

University of Colorado, Boulder, Colorado

MATHEMATICS and ASTRONOMY—O. W. MYERS

University of Chicago

and H. E. COBB

Lewis Institute, Chicago

METROLOGY—R. P. WILLIAMS

Cambridge, Mass.

PHYSICS—W. E. TOWER

Englewood High School, Chicago

SCIENCE QUESTIONS—FRANKLIN T. JONES

University School, Cleveland, Ohio

## SCHOOL SCIENCE AND MATHEMATICS

SMITH & TURTON, Publishers

440 KENWOOD TERRACE, CHICAGO

Published Monthly October to June, Inclusive

Price, \$2 00 Per Year; 25 Cents Per Copy

Entered as second-class matter January 5, 1905., at the Post Office at Chicago, Illinois,  
under the Act of Congress of March 3, 1879

ASSOCIATE EDITORS

L. D. AMES (*Mathematics*)  
University of Missouri, Columbia.

ALBERT C. AREY (*Earth Science*)  
Girls' High School, Brooklyn

M. A. BIGELOW (*Biology*)  
Teachers College, Columbia University, New York

N. HENRY BLACK (*Physics*)  
Roxbury Latin School, Boston, Mass.

EDWARD BOOTH (*Chemistry*)  
University of California, Berkeley

HORACE G. BYERS, (*Chemistry*)  
University of Washington, Seattle

A. P. CARMAN (*Physics*)  
University of Illinois, Urbana

E. C. CASE (*Earth Science*)  
State Normal School, Milwaukee, Wis.

CLARENCE E. COMSTOCK, (*Mathematics*)  
Bradley Polytechnic Institute, Peoria, Ill.

R. H. CORNISH (*Physics*)  
Wadleigh High School, New York City

HENRY CREW (*Physics*)  
Northwestern University, Evanston, Ill.

B. M. DAVIS (*Zoology*)  
State Normal School, Oxford, Ohio

E. W. DAVIS (*Mathematics*)  
University of Nebraska, Lincoln, Neb.

SAUL EPSTEEN (*Mathematics*)  
University of Colorado, Boulder, Colorado

W. A. FISKE (*Physics*)  
Occidental College, Los Angeles, Cal.

C. D. MESERVE, (*Mathematics*)  
Newtonville High School, Newtonville, Mass.

MISS EFFIE GRAHAM (*Mathematics*)  
High School Topeka, Kan.

JAMES W. GOLDTHWAITE (*Earth Science*)  
Northwestern University, Evanston, Ill.

F. E. GOODELL (*Physics*)  
High School, Des Moines, Iowa

J. E. GOULD (*Mathematics*)  
University of Washington, Seattle, Wash.

WILLIAM M. GREGORY (*Earth Science*)  
Central High School, Cleveland, Ohio.

E. L. HILL (*Biology*)  
Collegiate Institute, Guelph, Ont., Can.

T. C. HOPKINS (*Earth Science*)  
Syracuse University, Syracuse, N. Y.

O. C. KENYON (*Physics*)  
High School, Syracuse, N. Y.

C. A. LAISANT (*Mathematics*)  
Paris, France

H. R. LINVILLE (*Zoology*)  
Dewitt Clinton High School, New York City

THOMAS E. MCKINNEY (*Mathematics*)  
Wesleyan University, Middletown, Conn.

G. A. MILLER (*Mathematics*)  
University of Illinois, Urbana, Ill.

FRANK MORLEY (*Mathematics*)  
Johns Hopkins University, Baltimore, Md.

LOUIS MURBACH (*Biology*)  
Central High School, Detroit, Mich.

LYMAN C. NEWELL, (*Chemistry*)  
Boston University, Boston, Mass.

B. W. PEET, (*Chemistry*)  
State Normal College, Ypsilanti, Mich.

E. C. PERISHO (*Earth Science*)  
State University, Vermillion, S. D.

D. C. RIDGLEY (*Earth Science*)  
Illinois State Normal University, Normal, Ill.

H. S. ROBERTSON (*Mathematics and Physics*)  
Collegiate Institute, Stratford, Ont., Can.

FERNANDO SANFORD (*Physics*)  
Leland Stanford University, Palo Alto, Cal.

E. P. SCHOCH (*Chemistry*)  
University of Texas, Austin, Texas

ARTHUR SCHULTZE (*Mathematics*)  
High School of Commerce, New York

R. L. SHORT (*Mathematics*)  
378 Wabash Ave., Chicago.

C. A. SHULL, (*Zoology*)  
Kentucky University, Lexington, Ky.

DAVID EUGENE SMITH (*Mathematics*)  
Teachers College, Columbia University, New York

E. N. TRANSEAU (*Botany*)  
State Normal School, Charleston, Ill.

F. R. WATSON (*Physics*)  
University of Illinois, Urbana

W. W. WHITNEY (*Biology*)  
South Chicago High School, Chicago, Ill.

C. T. WRIGHT (*Earth Science*)  
Redlands, Cal.

## INDEX OF VOLUME VII (1907) BY TITLES.

## A

Abacus, An Improved. STELLA E. MYERS.....	601
Agricultural High School, The. H. H. LYON.....	280
Alaskan Maps, Two Special .....	239
Alloy, A Self-Igniting .....	702
American Federation of the Teachers of the Mathematical and Natural Sciences, The .....	242
Animal Life, The Educational Value in the Study of. ALONZO P. FROTH.....	568
"Another Point of View," Comment on. ALEXANDER SMITH.....	508
Apparatus, New. THOMAS B. FREAS.....	118
Apparatus to Illustrate Some Defects of the Eye and Their Remedy, An. CARL J. ULRICH .....	301
Artesian, What is Meant by the Word .....	237
Articles in Current Magazines .....	72, 159, 341, 430, 538, 616, 703, 790
Articulation of Science Teaching in the High School with that in the Grades, The. S. A. DOUGLASS.....	631
Association of Teachers of Mathematics in the Middle States and Maryland, Report of the Meeting of the .....	153, 337, 433
Atomic Theory, The Position of. WILLIAM LLOYD EVANS.....	547

## B

Biology as Method and as a Science in Secondary Schools. HENRY R. LINVILLE .....	264
Biology, Laboratory Notebooks in. WORRALLO WHITNEY .....	745
Biology Section of the Central Association of Science and Mathematics Teachers .....	156
Books Received .....	82, 343, 435, 545, 621, 709, 791
Book Reviews .....	73, 74, 75, 76, 77, 78, 79, 161, 162, 163, 164, 243, 244, 343, 435, 436, 545, 546, 621-630, 709, 792
Bureau of Geography of the Chicago Public Schools, The. JANE PERRY COOK .....	451

## C

Caesium, The Metal .....	236
Calendar Reforms and Metric Reforms. RUFUS P. WILLIAMS.....	457
Canalization of Streams, The. ROBERT M. BURNS .....	658
Carat, A Metric. R. P. WILLIAMS .....	783
Central Association of Science and Mathematics Teachers .....	63, 65, 67, 70, 706
Central Iowa Association of Science and Mathematics Teachers .....	542
Chemist, The Training of the Industrial. W. D. RICHARDSON .....	108
Chemistry Symposiums. The Notebook—	
A. E. PERKINS .....	557
H. S. REED .....	559
HARRY C. DOANE .....	652
F. C. IRWIN .....	655
Chemistry Teachers, New England Association of .....	151
Chromite in 1906, Production of .....	687
Coal, Notes on Production of .....	135
Coefficient of Linear Expansion of a Metal Tube, Apparatus for the Determination of the. E. T. BUCKNELL .....	493
Comments on Mr. Cavanagh's Article. WM. B. BORGERS .....	537
Committee on Coöperation, Report of the. C. E. PEET and W. S. McGEE .....	423
Communication, A. NELSON L. RORAY.....	605
Communication, A. O. L. PLUNKETT.....	59
Conductivity of Gases, To Show the Poor. W. M. BUTLER.....	664
Conic Sections by Paper Folding, Construction of. ALFRED J. LOTKA .....	595
Content Problems for High School Algebra, A Class of. G. W. MYERS .....	19
Convergence of Series, Graphical Illustration of. SAUL EPSTEEN and F. W. DOOLITTLE .....	770
Cooling by Expansion, Another Note on. W. S. FRANKLIN .....	704
Cooling by Expansion and Warming by Compression. CHARLES E. PEET .....	263

Cooling by Expansion, Discussions of. H. E. HOWE .....	588
Cornell's Summer School .....	651
Cove Creek Sulphur Beds, Utah .....	429

## D

Death Valley, Depth of .....	319
Decomposition of Gravity by the Inclined Plane, A Demonstration of the. FRED D. BARBER.....	498
Diamonds in Place in the United States .....	744
Dip-Needle Demonstration, Apparatus for. W. R. PYLE .....	466
Directory, Notice Concerning Science and Mathematics Association .....	82
Discovery of the Degradation of Coffee to Lithium, Ramsay's .....	698
Drainage of Swamp Land .....	540
Dust, Atmospheric .....	235

## E

Eastern Association of Physics Teachers, Meeting of the .....	618 ✓
Electric Furnace, Some Practical Applications of the. FRANK G. TAYLOR .....	404
Electrical Engineering for Teachers of Physics in Secondary Schools, A Course in. G. A. COWEN .....	125
Elementary Algebra in the First Year High School, Problems that Arise in the Teaching of. ALICE M. MCKELOD .....	363
Elementary Algebra, Some Modern Notions in the Rational Teaching of. JAS. F. MILLIS .....	176
Elementary Bacteriological Studies. WILBUR H. WRIGHT .....	499
Elementary Physics, Exposition, Experiment, and Discussion in the Teaching of. A. W. DUFF .....	141 ✓
Encyclopedias .....	620
Equation $\frac{a}{x} + \frac{b}{y} = c$ , Note on the solution of the. G. A. MILLER .....	667
Equipment, Some Notes on Chemical Laboratory. R. M. HUGHES .....	751
Experimental Chemistry, Profit and Loss in. LYMAN C. NEWELL .....	165
Erratum .....	164, 344, 546

## F

Factoring the Type $px^2 - qx + r$ . BYRON E. TOAN .....	291
Factoring the Type $px^2 + qx + r$ . DAVID EUGENE SMITH .....	529
Falling Bodies, Laws of. JOHN C. PACKARD .....	403
Field Trips in Botany. WILLARD N. CLUTE .....	398
Food Adulterants, Experiments for Detecting. GILBERT H. TRAFTON .....	476
Fruit Fly, The Merits of the. FRANK E. LUTZ .....	672

## G

Garden at Oak Park, The New Biological. THOMAS LARGE .....	219
Gas, Coke, Tar, and Ammonia, Production of .....	412
Geometry, A Suggestion for Review in. C. A. PETERSON .....	704
Geometry in the Nineteenth Century, On the Development of Elementary. G. A. MILLER .....	752
Geometry, Original Demonstrations in. FLETCHER DURELL .....	717
Geometry Teaching, Hints on. G. C. SHUTTS .....	105
Geography, The Teaching of.....	73
Geography, The Teaching of. ALEXANDER DARRONCH .....	276
Gridiron Pendulum, Note on the. C. F. ADAMS .....	355
Group Theory, An Application of. T. M. BLAKSLEE .....	536

## H

High Explosives. AUGUSTUS KLOCK .....	356
High School Algebra. HIRAM B. LOOMIS .....	590
High School Course in Hygiene, Suggestions from Bacteriology and Sanitation for the. MINNA C. DENTON .....	204
High School Physics, An Ideal Course in. K. E. GUTHE .....	254 ✓
High School Physiology. GRACE F. ELLIS .....	511

## INDEX

v

Homemade or Inexpensive Mathematical Apparatus. JOSEPH V. COLLINS .....	524
Hypsometer, A Simple. E. N. TRANSEAU .....	114

### I

Inch Absurdity, The .....	323
Index of Volume VII (1907) by Authors .....	vii
Index of Volume VIII (1907) by Titles .....	iii
Indiana Association of Science and Mathematics Teachers .....	542
Inductive Study of Relief Forms in Field Work and Contour Maps, The Value of the. W. H. PLATZER .....	446
Iowa State Teachers' Association .....	150

### L

Laboratory Work, A Method of Assigning. J. H. CLO .....	463
Letter, A. G. W. STEWART .....	148
Light, An Experiment in. A. S. CAVANAGH .....	669
Longitude and Time, Some Exercises in. HERBERT BROWNELL .....	583

### M

"Made in Germany," How Teachers of Physics are. E. A. STRONG ..	57
Mammalian Skeletons, Preparation of. BERTRAM G. SMITH .....	44
Mathematical Announcements .....	321
Mathematical Correction .....	336
Mathematical News from Colorado .....	150
Mathematical Note. S. L. MACDONALD .....	536
Mathematical Notes .....	233, 434
Mathematics, A Few Deficiencies in the Teaching of. C. E. COM- STOCK .....	12, 97
Mathematics as a Factor in Character Building. IRA S. CONDIT .....	640
Mathematics in and Below the High School. L. D. WINES .....	183
Mathematics in California Secondary Schools, The Teaching of. CHARLES A. NOBLE .....	762
Mathematics of Elementary Chemistry, The. J. MCINTOSH .....	383
Mathematics Section at the St. Louis Meeting of the Central Associa- tion, The .....	707
Mathematics Teachers, Kansas Association of .....	239
Mathematics Teachers of New England, Association of .....	152
Mechanics for the High School, More Interesting and Practical. J. M. JAMESON .....	345
Method of Classifying the Inorganic Acids for Analysis. A. W. S. LEAVENWORTH .....	1
Metric System, Thoughts on the Practical Use of the. F. W. TURNER ..	8
Metric Voice from Australia .....	322
Metrology Notes .....	410, 601
Mineral Productions in the United States in 1905, The .....	160
Migration Records in Connection with Bird Study in Schools, Advan- tages of. FRANK SMITH .....	221
Missouri Society of Teachers of Mathematics and Science .....	339, 618
Modeling Wax in Physiology and Zoölogy. ERNEST C. WITHAM .....	565
Model-making by Zoölogy Students. F. C. LUCAS .....	224
Moments, Practical Equation of. F. C. VAN DYCK .....	481
Mounting a Demonstrating Galvanometer. F. R. GORTON .....	401
Movement Among Physics Teachers, The New. CIRCULAR V .....	328

### N

Nepheloscope, Espy's. CLEVELAND ABBE .....	586
Nernst Lamp in the Laboratory and Simple Experiments on Radio- Activity, The. F. R. GORTON .....	34
New Jersey Science Teachers' Association, Report of the Meeting of the .....	432, 787
New York Association of Biology Teachers, Report of the .....	705
New York City, Chemistry Teachers' Club of .....	150, 337
Niagara Falls, The Recession of .....	429
Noden Valve, The. CYRIL O. SMITH .....	665

## O

Observations of the Teaching of Mathematics in Prussia, Personal.	518
HERBERT E. COBB .....	518
Ohio Teachers of Mathematics and Science, Association of .....	241
Ontario Educational Association, Mathematical and Physical Section of the .....	542
Optics by the Wave Method. A. L. CAVANAGH .....	293
Out-Door Work by the Pupil on his Daily Trips to School. J. F. THOMPSON* .....	53

## P

Pacific Coast Association of Chemistry and Physics Teachers .....	62
Pendulum, An Apparatus for Deriving Laws of. ELLISON L. ROSS .....	760
Pennsylvania State Teachers' Association, Science and Mathematical Section of the High School Department of the .....	240
Personal Items .....	707, 789
Phosphates of Northern Arkansas .....	428
Physical Geography, Field Work in. JENNIE T. MARTIN .....	304
Physical Science, Some Recent Advances in. F. H. GETMAN .....	372
Physical Geography, The Culture Value of. HERBERT C. WOOD .....	437
Physics, A List in .....	699
Physics Club in a Normal School, The. L. A. ROBINSON .....	461
Physics Experiments, Two Interesting. FRANK M. GREENLAW .....	127
Physics in the Secondary School. T. QUINCY BROWNE .....	730✓
Physics Teaching, A Proposed Improvement in. L. B. AVERY .....	196
Physiology, How and How Much? CLIFFORD CROSBY .....	733
Physiology, The Teaching of. H. W. NORRIS .....	210
Plant Physiology in Secondary Schools. JOSEPH Y. BERGEN .....	389
Platinum and Copper, Notes on .....	140
Platinum, To Utilize Scraps of. NICHOLAS KNIGHT .....	262
Point of View in Chemistry, Another. F. N. PETERS .....	502
Point of View in Chemistry, The. ALEXANDER SMITH .....	128
Polariscope, A Simple Form of. FREDERICK H. GETMAN .....	484
Preparation of the Teacher of Mathematics in Secondary Schools, The. DAVID EUGENE SMITH .....	247
Presentation of the Ideas of Positive and Negative Numbers to Be- ginners, The. R. M. McDILL .....	307
Problem Department. IRA M. DELONG .....	60, 136, 229, 314, 413, 530, 607, 688, 779
Progress in the South, Educational. CHARLES A. SHULL .....	756
Prony Brake, Modern .....	245
Propositions in Geometry, The Normal Order: Opening. A. L. BAKER .....	94
Pythagorean Theorem, A High School Boy's Proof of the. EARL DAVIDSON .....	777
Pythagorean Theorem, An Extension of the. H. A. CONVERSE .....	778

## R

Rectifier for a Dollar, An Efficient. CYRIL O. SMITH .....	665
Remarkable Phenomenon, A. C. E. PEET .....	303
Report of the Committee of the Central Association on Algebra in the Secondary Schools, Preliminary .....	674
Resume of Current Magazines for Teachers of Secondary Mathematics	233

## S

Science and Mathematics Teachers, South Dakota Association of .....	787 ✓
Science Course, A Preliminary. R. O. AUSTIN .....	324
Science for Culture. JOHN F. WOODHULL .....	83
Science Questions, Department of. FRANKLIN T. JONES .....	234, 320, 417, 534, 611, 693, 784
Science Teaching, Standards in. FRANKLIN T. JONES .....	122
Sciences—Geology, Culture Course in the. WILLIAM P. HOLT .....	724
Secondary Mathematics. B. L. SHORT .....	290
Secondary Mathematics in France, Current Tendencies in. J. W. A. YOUNG .....	480

\*See footnote, page 164, February issue.

Secondary Mathematics in Italy, Current Tendencies in. J. W. A: YOUNG .....	352
Secondary School Geography: What Shall it be? R. H. WHITBECK .....	579
Secondary School Teacher of Physics, Opportunities Due the. WILLIAM C. COLLAR .....	574
Siphon—Two New Lecture Demonstrations, The. WILL C. BAKER .....	748
Solution of $\frac{a}{x} - \frac{b}{y} = c$ , The. M. O. TRIPP .....	598
Spectra, A Lecture Table Experiment in. C. M. WESTCOTT .....	113
Spider Study in a Zoölogy Course. WILBUR H. WRIGHT .....	215
Spring, A Big .....	729
Stomata in Leaves, Demonstration. E. H. DAVIES, E. E. UNWIN .....	686
Sugar Refinery, A Visit to a. HAROLD BISBEE .....	273
Symbols of Elementary Mathematics, On Some of the. G. A. MILLER .....	406

## T

Teacher of Mathematics, The. HENRY L. COAR .....	282
Thermometric Conversion. HILTON I. JONES .....	673
Tree Planting, Progress and Value of .....	670
Trouble in Solid Geometry. G. W. GREENWOOD .....	102
Tungsten .....	750
Type $px^2+qx+r$ , A Communication Concerning the. R. W. ANGLIN .....	604

## U

United States Geographic Board .....	326
University of Wisconsin, Mail-Study of the .....	783

## W

Water in Crystalline Rocks, Occurrences of .....	238
Weight Exerted at the Center of Gravity, A Suggestion for Presenting the Idea of. HENRY S. CURTIS .....	496
Wentworth, Biography of George Albert. B. F. FINKEL .....	485
Whitherward in Chemistry. H. F. SHELDON .....	468
Work of the Past Season in Southeastern Alaska .....	422

## Z

Zoölogy Notes .....	335
---------------------	-----

## INDEX BY AUTHORS—VOLUME VII, 1907.

## A

ABBE, CLEVELAND. Washington, D. C. ....	586
ADAMS, C. F. Central High School, Detroit. ....	355, 699
AMES, L. D. University of Missouri. ....	339
AMMERMAN, CHAS. McKinley High School, St. Louis, Mo. ....	674
ANGLIN, R. W. Essex High School, Essex, Ontario. ....	604
AUSTIN, R. O. Central High School, Columbus, Ohio. ....	324
AVERY, LEWIS B. High School, Redlands, California. ....	196

## B

BAKER, ARTHUR L. Manual Training High School, Brooklyn, N. Y. ....	94
BAKER, WILL C. School of Mining, Queen's University, Kingston, Ontario .....	748
BARBER, FRED D. Illinois State Normal University .....	498
BEESON, MARTHA A. Des Moines, Iowa .....	150
BERGEN, JOSEPH T. Cambridge, Mass. ....	389
BISBEE, HAROLD. High School, Dorchester, Mass. ....	273
BLACK, N. HENRY. Roxbury Latin School, Boston, Mass. ....	618
BLAKSLEE, T. M. Ames, Iowa .....	536
BORGERS, WM. B. Central High School, Grand Rapids, Mich. ....	538
BROWN, ROBERT M. State Normal School, Worcester, Mass. ....	658

BROWNELL, HERBERT. Nebraska State Normal School, Pew, Neb. ....	583
BROWNE, T. QUINCY. Morristown School, N. J. ....	730
BUCKNELL, E. T. St. Philip's Grammar School, Birmingham, Eng. ....	493
BUTLER, WM. M. McKinley High School, St. Louis, Mo. ....	664

## C

CALDWELL, OTIS W. University of Chicago. ....	793, 796
CAVANAGH, A. L. Los Angeles High School. ....	293, 669
CHUTE, H. N. Ann Arbor High School, Ann Arbor, Mich. ....	699, 701
CLO, J. HARBY. State College of Washington. ....	463
CLUTE, WILLARD N. Joliet High School, Ill. ....	398
COAR, HENRY L. Marietta College, Marietta, Ohio. ....	282
COBB, HERBERT E. Lewis Institute, Chicago. ....	518, 799
COLLAR, DR. WILLIAM C. Roxbury Latin School, Roxbury, Mass. ....	574
COLLINS, JOSEPH V. State Normal School, Stevens Point, Wis. ....	524
COMSTOCK, C. E. Bradley Polytechnic Institute, Peoria, Ill. ....	12, 97, 706
CONDIT, IRA S. Iowa State Normal School, Cedar Falls, Ia. ....	640, 674
CONVERSE, H. A. Davis and Elkins College, Elkins, W. Va. ....	778
COOK, JANE PERRY. Chicago Normal School. ....	451
COWEN, GEORGE A. West Roxbury High School, Boston. ....	125
CROSBY, CLIFFORD. McKinley High School, St. Louis, Mo. ....	733
CURTIS, HENRY S. Boys' High School, Brooklyn, N. Y. ....	496

## D

DAVIDSON, EARL. Kansas City, Mo. ....	777
DARROCH, ALEXANDER. ....	276
DAVIES, E. H. County School, Barry, Glam, Eng. ....	686
DELONG, IRA M. University of Colorado, Boulder, Colorado. ....	60, 136, 229, 314, 413, 530, 607, 688, 779
DENTON, MINNA C. Lewis Institute, Chicago. ....	204
DOANE, HARRY C. Central High School, Grand Rapids, Mich. ....	632
DOOLITTLE, F. W. University of Colorado, Boulder, Col. ....	770
DUFF, A. WILMER. Worcester Polytechnic Institute, Worcester, Mass. ....	141
DUGLASS, S. A. Central High School, St. Louis, Mo. ....	631
DURELL, FLETCHER. Lawrenceville School, Lawrenceville, N. J. ....	717

## E

ELLIS, GRACE F. Central High School, Grand Rapids, Mich. ....	511
EPSTEEN, SAUL. University of Colorado, Boulder, Colo. ....	770
EVANS, WM. LLOYD. Ohio State University, Columbus, O. ....	547

## F

FINKEL, B. F. Drury College, Springfield, Mo. ....	485
FISKE, W. A. Richmond High School, Indiana. ....	543
FRANCIS, WILLIAM A. Phillips Exeter Academy, Exeter, N. H. ....	152
FRANKLIN, W. S. Lehigh University, Bethlehem, Pa. ....	704
FREAS, THOMAS B. University of Chicago, Chicago, Ill. ....	118
FROTH, ALONZO P. Spokane High School, Washington. ....	568
FULLER, GEO. D. ....	792

## G

GETMAN, FREDERICK H. Stamford High School, Conn. ....	372, 484
GODDARD, MARTHA F. New York City. ....	706
GORTON, F. R. Michigan State Normal College, Ypsilanti. ....	401
GRABER, M. E. Heidelberg University, Tiffin, Ohio. ....	242
GREENE, C. W. Albion College, Albion, Mich. ....	699
GREENLAW, FRANK M. Rogers High School, Newport, R. I. ....	127
GREENWOOD, G. W. Dunbar, Pa. ....	102, 233, 627
GOLDTHWAIT, JAMES W. Northwestern University, Evanston, Ill. ....	82
GORTON, F. R. Michigan State Normal College, Ypsilanti, Mich. ....	34
GREGORY, W. M. Central High School, Cleveland, Ohio. ....	244, 436
GUTHÉ, K. E. State University, Iowa City, Iowa. ....	254

## H

HANKINSON, T. L. State Normal School, Charleston, Ill. .... 795, 796  
 HOLT, WILLIAM P. Central High School, Toledo, Ohio ..... 724  
 HOWE, H. E. University of Missouri, Columbia ..... 588  
 HUGHES, R. M. Miami University, Oxford, Ohio ..... 751

## I

IBWIN, F. C. Detroit Central High School ..... 655

## J

JAMESON, J. M. Pratt Institute, Brooklyn ..... 345  
 JONES, FRANKLIN T. University School, Cleveland ..... 122, 234, 320, 417, 534, 611, 693, 784  
 JONES, HILTON I. Lawrence Scientific School ..... 673

## K

KIMBALL, A. B. .... 162  
 KLOCK, AUGUSTUS. High School, Beverly, Mass. .... 356  
 KNIGHT, NICHOLAS. Cornell College, Mount Vernon, Ia. .... 262

## L

LARGE, THOMAS. Oak Park High School, Illinois ..... 219  
 LEAVENWORTH, W. S. Olivet College, Olivet, Michigan ..... 1  
 LINVILLE, HENRY R. DeWitt Clinton High School, New York City ..... 264  
 LOOMIS, HIRAM B. Hyde Park High School, Chicago ..... 500  
 LOTKA, ALFRED J. Research Laboratory, Laurel Hill Works, L. I. ..... 595  
 LUCAS, FREDERICK C. Englewood High School, Chicago ..... 224  
 LUTZ, FRANK E. Cold Spring Harbor, N. Y. ..... 672  
 LYON, H. H. Bainbridge, N. Y. ..... 280

## M

MANN, C. R. University of Chicago ..... 243, 328  
 MARTIN, JENNIE T. Central High School, Buffalo ..... 304  
 MATHEWS, JANE. High School, Altoona, Pa. .... 240  
 McCONNEL, ELIZABETH. Shortridge High School, Indianapolis, Ind. ..... 674  
 McDILL, ROBERT M. New Castle, Ind. .... 307  
 McGEE, W. S. Hyde Park High School, Chicago ..... 423  
 MCINTOSH, J. Fowler Union High School, California ..... 383  
 MCKELDEN, ALICE H. Philadelphia High School for Girls ..... 363  
 MCKINNEY, THOMAS E. Wesleyan University, Middletown, Conn. ..... 627  
 MILLER, G. A. University of Illinois, Urbana, Ill. .... 406, 667, 752  
 MILLIS, JAS. F. Shortridge High School, Indianapolis, Ind. ..... 176  
 MILLS, JOS. S. High School of Commerce, New York ..... 150, 337  
 MONTHLY WEATHER REVIEW ..... 235  
 MYERS, G. W. University of Chicago ..... 19, 74, 75, 76, 233, 244, 321, 434, 435, 621-626, 711-713  
 MYERS, STELLA E. Kansas City, Mo. .... 601

## N

NEWELL, LYMAN C. Boston University ..... 165  
 NEWHALL, C. W. Shattuck School, Faribault, Minn. .... 674  
 NOBLE, CHARLES A. University of California, Berkeley, Cal. ..... 762  
 NORRIS, H. W. Iowa College, Grinnell ..... 210

## P

PARROTT, L. M. Saginaw High School, Saginaw, Mich. .... 39  
 PEET, CHARLES E. Lewis Institute, Chicago ..... 263, 303, 423  
 PERKINS, A. E. High School, Holland, Michigan ..... 557  
 PETERS, FREDUS N. Central High School, Kansas City, Mo. .... 502  
 PETERSON, C. A. Jefferson High School, Chicago ..... 704  
 PLATZER, WILLIAM H. Poughkeepsie, N. Y. .... 446  
 PLUNKETT, O. L. ..... 59  
 PYLE, WILLARD R. Morris High School, New York City ..... 466

## R

RANSOM, WILLIAM R. Tufts College, Mass.	336
REED, H. S. Michigan Agricultural College	559
RICHARDSON, W. D. Chief Chemist, Swift & Co., Chicago	108
ROBINSON, L. A. Oregon State Normal School, Monmouth	461
RORAY, NELSON, L. Jersey City High School, Jersey City, N. J.	605
RORER, J. L. Central High School, Philadelphia	156, 433
ROSS, ELLISON L. University of Nebraska, Lincoln, Neb.	760

## S

SCIENTIFIC AMERICAN	403, 608
SCIENTIFIC AMERICAN SUPPLEMENT	236
SHELDON, H. F. Armijo Union High School, California	468
SHORT, R. L. 378 Wabash Avenue, Chicago	290
SHULL, CHARLES A. Kentucky University, Lexington, Ky.	756
SHUTTS, G. C. State Normal School, Whitewater, Wis.	105
SLAUGHT, H. E. University of Chicago	707
SMITH, ALEXANDER. University of Chicago, Chicago, Ill.	128, 508
SMITH, BERTRAM G. University of Michigan, Ann Arbor	44
SMITH, CHAS. H. Hyde Park High School, Chicago ..... 77, 341, 430, 538, 543, 546, 703, 707, 710, 789, 790, 792, 800	665
SMITH, CYRIL O. High School, Hilo, Hawaii	665
SMITH, DAVID E. Teachers' College, Columbia University	247, 335, 529
SMITH, FRANK. University of Illinois	161, 221, 343, 630
STEWART, G. W. University of North Dakota, Grand Forks	148
STRONG, E. A. State Normal School, Ypsilanti, Michigan	57
SYKES, MABEL. South Chicago High School, Chicago	72, 674

## T

TAYLOR, FRANK G. High School, Oregon, Ill.	404
TOAN, BYRON E. Boulder, Montana	291
TRAFTON, GILBERT H. Passaic High School, N. J.	432, 476
THOMPSON, J. F. Richmond High School, Richmond, Ind.	53
TRANSEAU, E. N. Stations for Experimental Evolution, Cold Spring Harbor, L. I.	114
TRIPP, M. O. College of the City of New York	598
TURNER, F. W. Mechanic Arts High School, Boston	8
TURTON, CHAS. M. South Chicago High School, Chicago ..... 65, 74, 545, 626, 630, 710, 794	78

## U

ULRICH, CARL J. Duluth Central High School, Minn.	301
UNITED STATES GEOLOGICAL SURVEY BULLETIN	744
..... 237, 239, 319, 326, 428, 540, 687	744
UNIVERSITY OF WISCONSIN	783
UNWIN, ERNEST E. University, Leeds, Eng.	687

## V

VAN DYCK, F. C. Rutgers College, N. J.	481
--	-----

## W

WESTCOTT, C. M. High School, Redlands, California	113
WHITBECK, R. H. State Model School, Trenton, N. J.	579
WHITNEY, WORRALLO. South Chicago High School, Chicago	745, 797
WILLIAMS, RUFUS P. Cambridge, Mass.	322, 323, 410, 457, 691, 783
WINES, L. D. Ann Arbor High School	183
WITHAM, E. C. Perkins Institution for the Blind, South Boston, Mass.	565
WOOD, HERBERT C. East High School, Cleveland, Ohio	437
WOOD, L. H. State Normal School, Kalamazoo, Mich.	714
WOODHULL, JOHN F. Teachers College, Columbia University	83
WRIGHT, WILBUR H. McKinley High School, Chicago	215, 499
WYLIE, ROBERT B. State University of Iowa	78

## Y

YOUNG, J. W. A. University of Chicago	352, 489
---------------------------------------	----------

